CLAIMS

What is claimed is:

1. A method for searching an audio database for a target audio clip in a multiprocessor system, comprising:

partitioning said audio database into a plurality of groups;

establishing a model for said target audio clip;

dynamically scheduling said plurality of groups to a plurality of processors in said multiprocessor system; and

processing said scheduled groups in parallel by said plurality of processors to search for said target audio clip.

2. The method of claim 1, wherein partitioning said audio database comprises determining a size for each of said plurality of groups, said size being determined to reduce the amount of overlapped computation among said plurality of groups and load imbalance in parallel processing of said plurality of groups.

3. The method of claim 1, wherein establishing a model for said target audio clip comprises extracting a feature vector sequence from said target audio clip and modeling said feature vector sequence based on a Gaussian Mixture model ("GMM"), said GMM including a plurality of Gaussian components.

4. The method of claim 3, wherein modeling said feature vector sequence comprises estimating mixture weights for each of said plurality of Gaussian components.

5. The method of claim 1, wherein processing said scheduled groups in parallel comprises:

partitioning each of said scheduled groups into at least one segment; and

for each segment,

extracting a feature vector sequence for the segment, and

modeling said feature vector sequence based on a Gaussian Mixture model ("GMM"), said GMM including a plurality of Gaussian components.

6. The method of claim 5, wherein each of said at least one segment has the same length in time as that of said target audio clip.

7. The method of claim 5, wherein if there are more than one segments in an audio stream, each segment partially overlaps with a segment that immediately precedes that segment.

8. The method of claim 5, wherein said plurality of Gaussian components are common for different segments and said target audio clip.

9. The method of claim 8, wherein modeling said feature vector sequence comprises estimating mixture weights for each of said plurality of Gaussian components.

10. The method of claim 9, further comprising: for each segment,

computing a Kullback-Leibler ("KL") distance between a GMM of said segment and a GMM of said target audio clip; and

determining that said segment matches said target audio clip, if said KL distance is smaller than a pre-determined threshold.

11. The method of claim 10, further comprising skipping processing a number of segments if said KL distance is larger than a predetermined value, said number of segments dependent on the value of said KL distance.

12. The method of claim 1, wherein said multiprocessor system comprises a memory shared by said plurality of processors.

13. An apparatus for searching an audio database for a target audio clip in a multiprocessor system, comprising:

a partitioning module to partition said audio database into a plurality of groups;

a scheduler to dynamically schedule said plurality of groups to a plurality of processors in said multiprocessor system; and

an audio searching module for each of said plurality of processors to process said scheduled groups in parallel by said plurality of processors to search for said target audio clip.

14. The apparatus of claim 13, wherein said partitioning module further determines a size for each of said plurality of groups, said size being determined to reduce the amount of overlapped computation among said plurality of groups and load imbalance in parallel processing of said plurality of groups.

15. The apparatus of claim 13, wherein an audio searching module comprises:

a feature extractor to partition an input audio stream into at least one segment and to extract a feature vector sequence from each of said at least one segment, said at least one segment having the same length in time as that of said target audio clip; and

a modeling module to model said feature vector sequence for each segment based on a Gaussian Mixture model ("GMM"), said GMM including a plurality of Gaussian components, said plurality of Gaussian components being common among all of the segments.

16. The apparatus of claim 15, wherein one of audio searching modules further process said target audio clip by extracting a feature vector sequence from said target audio clip and by modeling said feature vector sequence using

said GMM, said GMM including a plurality of Gaussian components common for said target audio clip and segments of said input audio stream.

17. The apparatus of claim 16, wherein an audio searching module further comprising a decision maker to compute a Kullback-Leibler ("KL") distance between a GMM of a segment of said input audio stream and a GMM of said target audio clip; and to determine whether said segment matches said target audio clip based on said KL distance.

18. The apparatus of claim 17, wherein said decision module further determines how many segments are to be skipped from processing based on said KL distance.

19. An article comprising a machine-readable medium that contains instructions, which when executed by a processing platform, cause said processing platform to perform operations comprising:

partitioning said audio database into a plurality of groups;

establishing a model for said target audio clip;

dynamically scheduling said plurality of groups to a plurality of processors in said multiprocessor system; and

processing said scheduled groups in parallel by said plurality of processors to search for said target audio clip.

20. The article of claim 19, wherein partitioning said audio database comprises determining a size for each of said plurality of groups, said size being determined to reduce the amount of overlapped computation among said plurality of groups and load imbalance in parallel processing of said plurality of groups.

21. The article of claim 19, wherein establishing a model for said target audio clip comprises extracting a feature vector sequence from said target audio clip and modeling said feature vector sequence based on a Gaussian Mixture model ("GMM"), said GMM including a plurality of Gaussian components.

22. The article of claim 21, wherein modeling said feature vector sequence comprises estimating mixture weights for each of said plurality of Gaussian components.

23. The article of claim 19, wherein processing said scheduled groups in parallel comprises:

partitioning each of said scheduled groups into at least one segment; and

for each segment,

extracting a feature vector sequence for the segment, and

modeling said feature vector sequence based on a Gaussian Mixture model ("GMM"), said GMM including a plurality of Gaussian components.

24. The article of claim 22, wherein each of said at least one segment has the same length in time as that of said target audio clip.

25. The article of claim 22, wherein if there are more than one segments in an audio stream, each segment partially overlaps with a segment that immediately precedes that segment.

26. The article of claim 22, wherein said plurality of Gaussian components are common for different segments and said target audio clip.

27. The article of claim 26, wherein modeling said feature vector sequence comprises estimating mixture weights for each of said plurality of Gaussian components.

28. The article of claim 27, wherein said operations further comprise: for each segment,

computing a Kullback-Leibler ("KL") distance between a GMM of said segment and a GMM of said target audio clip; and

determining that said segment matches said target audio clip, if said KL distance is smaller than a pre-determined threshold.

29. The article of claim 28, wherein said operations further comprise skipping processing a number of segments if said KL distance is larger than a

predetermined value, said number of segments dependent on the value of said KL distance.

30. The article of claim 19, wherein said multiprocessor system comprises a memory shared by said plurality of processors.